

KARYOLOGICAL RECORDS ON THE INDIAN SPIDERS

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ABSTRACT

325 cytogenetic records are found for Indian spiders till date. Of these 232 species (71.38%) have sex chromosome system of the X1X20 type; 48 species (12.92%) have an X0 system; 39 species (12%) have an X1X2X30 system; 1 species (0.3%) have sex chromosome system of the X1X2Y type; 4 species (1.23%) have an X1X2X3X40 system; 1 species (0.3%) has an SCS of the X1X2Y type.

INTRODUCTION

The pioneering contribution on the karyotypes of Indian spiders is that of Bole-Gowda, 1958 and Sharma *et al.*, 1958. Then major contributions in this field are those of Mittal (1960,1961,1966,1970); Datta & Chatterjee, 1983, Parida *et al.*, 1986; Srivastava & Shukla, 1986; Sharma & Parida, 1987 and Datta *et al.*, 1995.

According to Platnick (2014), the order Araneae possesses 114 families, 3935 genera, and 44,906 species. However, currently, there are 791 cytogenetic records in spiders from the world (www.arthropodacytogenetics.bio.br/spiderdatabase). Of these, 456 species (67.3%) have sex chromosome system of the X1X20 type; 105 species (15.5%) have an X0 system; 59 species (8.7%) have an X1X2X30 system; 10 species (1.5%) have sex chromosome system of the X1X2Y type; 5 species (0.7%) have an X1X2X3X40 system; 5 species (0.7%) have an XY SCS; 5 species (0.7%) have an SCS of the X1X2X3Y type; 1 species (0.1%) has an SCS of the X1X2X3X4X5Y type; and 1 species exhibits variations of a multiple XnYn SCS. In 31 species (4.6%), the SCS has not been identified. The number of cytogenetic records (791) in spiders is slightly higher than the number of spider species analyzed chromosomally (665) because more than one type of SCS has been registered for some species.

In the first cytogenetic studies in spiders performed by Carnoy (1885), gonads of male or female individuals were imbedded in paraffin, sectioned, and stained with Heidenhain's iron haematoxylin. Decades later, Sharma *et al.* (1959) and Beçak & Beçak (1960) were the first researchers to obtain spider chromosomes by the aceto-orcein or aceto-carmin squash methods. Pinter & Walters (1971) introduced

the use of colchicine solution for cytological preparations of spider testes and ovaries. In the same decade, Brum-Zorrila & Cazenave (1974) applied 3:1 methanol:acetic acid as a fixative solution and Giemsa solution as a stain. Matsumoto (1977) pioneered the observation of chromosomes in spider embryos. Embryos are a valuable source of mitotic metaphase cells due to the high rate of cellular division that occurs during embryonic development. There are a number of tissues that can be used in cytogenetic studies of spiders, such as gonads (testes and ovaries), cerebral ganglion, and cultured blood cells, as described by Wang & Yan (2001). Levan classifies the chromosomal morphology of meiotic (bivalents and univalents) or mitotic metaphase chromosomes in digital images. The morphological criterion of the plugin is a modification of the criteria described by Levan *et al.* (1964) and Green & Sessions (1991).

A concise updated list of karyotypes of Indian spiders is given in this paper.

MATERIALS AND METHODS

The karyological record present in this paper is prepared by referring documents like the spider cytogenetic database, **version: 3.0**, July-2014 and also by consulting published papers in journals.

RESULTS

With respect to Indian spiders there are 325 cytogenetic records found till date. Of these 232 species (71.38%) have sex chromosome system of the X1X20 type; 48 species (12.92%) have an X0 system; 39 species (12%) have an X1X2X30 system; 1 species (0.3%) have sex chromosome system of the X1X2Y type; 4 species (1.23%) have an X1X2X3X40 system; 1 species (0.3%) has an SCS of the X1X2Y type.

Spiders from only 29 families are investigated for karyological studies. Astonishingly no karyological studies in Indian spiders have been carried out since 1992.

The spider *Uloborus danolius* Tikader, 1969 possesses least number of chromosomes i.e. 10 and the spider *Poecilotheria formosa* Pocock, 1899 has maximum number of chromosomes i. e. 110 followed by *Ischnothele indicola* Tikader, 1969 having 86 chromosomes.

The available karyological data for Indian spiders indicate that there is an urgent need to study the chromosomes in spiders and further DNA sequencing studies are also essential to resolve the controversies in proper identification of spiders.

Table -1, Karyological records of Indian Spiders.

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
Agelenidae C.L. Koch, 18371992b					
1	<i>Agelena gautami</i> Tikader, 1962	43	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
2	<i>A. gautami</i> Tikader 1962	43	$X_1X_2X_3$	$38T+X_1X_2X_3T$	Datta & Chatterjee, 1992b
Araneidae Clerck, 1757					
3	<i>A. diadematus</i> Clerck, 1757	24	X_1X_2	—	Mittal, 1960
4	<i>A. diadematus</i> Clerck, 1757	24	X_1X_2	$22A+X_1X_2A$	Mittal, 1966a
5	<i>Araneus</i> sp.	24	X_1X_2	—	Mittal, 1960
6	<i>Argiope minuta</i> Karsch, 1879	24	X_1X_2	—	Datta & Chatterjee, 1983
7	<i>A. minuta</i> Karsch, 1879	24	X_1X_2	$22T+X_1X_2T$	Datta & Chatterjee, 1988
8	<i>Argiope pulchella</i> Thorell, 1881	24	X_1X_2	$22A+X_1X_2A$	Bole-Gowda, 1958
9	<i>Cyclosa bifida</i> (Doleschall, 1859)	24	X_1X_2	—	Datta & Chatterjee, 1983
10	<i>C. bifida</i> (Doleschall, 1859)	24	X_1X_2	$22A+X_1X_2A$	Datta & Chatterjee, 1984
11	<i>C. bifida</i> (Doleschall, 1859)	24	X_1X_2	$22T+X_1X_2T$	Datta & Chatterjee, 1988
12	<i>Cyclosa confraga</i> (Thorell, 1892)	24	X_1X_2	—	Mittal, 1960
13	<i>C. confraga</i> (Thorell, 1892)	24	X_1X_2	$22A+X_1X_2A$	Mittal, 1966a
14	<i>Cyclosa conica</i> (Pallas, 1772)	24	X_1X_2	—	Mittal, 1960
15	<i>C. conica</i> (Pallas, 1772)	24	X_1X_2	$22A+X_1X_2A$	Mittal, 1966a

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
16	<i>Cyclosa spirifera</i> Simon, 1889	24	X1X2	—	Datta & Chatterjee, 1983
17	<i>C. spirifera</i> Simon, 1889	24	X1X2	22A+X1X2A	Datta & Chatterjee, 1984
18	<i>C. spirifera</i> Simon, 1889	24	X1X2	22T+X1X2T	Datta & Chatterjee, 1988
19	<i>Cyclosa walckenaeri</i> (O.P.-Cambridge, 1889)	24	X1X2	—	Mittal, 1960
20	<i>C. walckenaeri</i> (O.P.-Cambridge, 1889)	24	X1X2	22A+X1X2A	Mittal, 1966a
21	<i>Cyclosa</i> sp.	24	X1X2	—	Mittal, 1960
22	<i>Cyrtophora cicatrosa</i> (Stoliczka, 1869)	24	X1X2	—	Parida & Sharma, 1987a
23	<i>C. cicatrosa</i> (Stoliczka, 1869)	24	X1X2	—	Sharma & Parida, 1987
24	<i>Cyrtophora citricola</i> (Forskål, 1775)	24	X1X2	—	Mittal, 1960
25	<i>C. citricola</i> (Forskål, 1775)	24	X1X2	22A+X1X2A	Mittal, 1966a
26	<i>C. citricola</i> (Forskål, 1775)	26	X1X1X2X2	22T+X1X1X2X2T	Datta & Chatterjee, 1988
27	<i>Cyrtophora feai</i> (Thorell, 1887)	24	X1X2	22A+X1X2A	Bole-Gowda, 1958
28	<i>Eriovixia poonaensis</i> (Tikader & Bal, 1981)	24	X1X2	—	Datta & Chatterjee, 1983
29	<i>E. poonaensis</i> (Tikader & Bal, 1981)	24	X1X2	—	Sharma & Parida, 1987
30	<i>E. poonaensis</i> (Tikader & Bal, 1981)	24	X1X2	22T+X1X2T	Datta & Chatterjee, 1988
31	<i>Eustala</i> sp.	24	X1X2	—	Mittal, 1961

Continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
32	<i>Gasteracantha hasselti</i> C.L. Koch, 1837	16	X1X2	—	Datta & Chatterjee, 1983
33	<i>G. hasselti</i> C.L. Koch, 1837	16	X1X2	14T+X1X2T	Datta & Chatterjee, 1988
34	<i>Gasteracantha kuhli</i> C.L. Koch, 1837	16	X1X2	—	Datta & Chatterjee, 1983
35	<i>G. kuhli</i> C.L. Koch, 1837	16	X1X2	14T+X1X2T	Datta & Chatterjee, 1988
36	<i>Larinia directa</i> (Hentz, 1847)	24	X1X2	—	Mittal, 1960
37	<i>L. directa</i> (Hentz, 1847)	24	X1X2	22A+X1X2A	Mittal, 1966a
38	<i>Larinia</i> sp.	24	X1X2	—	Mittal, 1960
39	<i>Larinia</i> sp.	24	X1X2	—	Sharma et al., 1960
40	<i>Larinia</i> sp.	24	X1X2	22A+X1X2A	Mittal, 1966a
41	<i>Neoscona achine</i> (Simon, 1906)	24	X1X2	—	Datta & Chatterjee, 1983
42	<i>N. achine</i> (Simon, 1906)	24	X1X2	22T+X1X2T	Datta & Chatterjee, 1988
43	<i>Eoscona arabesca</i> (Walckenaer, 1841)	24	X1X2	—	Mittal, 1960
44	<i>N. arabesca</i> (Walckenaer, 1841)	24	X1X2	22A+X1X2A	Mittal, 1966a
45	<i>Neoscona mukerjei</i> Tikader, 1980	24	X1X2	—	Sharma & Parida, 1987
46	<i>Neoscona pavida</i> (Simon, 1906)	24	X1X2	—	Mittal, 1960
47	<i>Neoscona</i> sp.	14	X1X2	—	Parida & Sharma, 1987a
48	<i>Neoscona</i> sp.	24	X1X2	—	Parida & Sharma, 1987a, continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
49	<i>Neoscona</i> sp.	13	X	—	Parida & Sharma, 1987a
50	<i>Neoscona</i> sp.	13	X	—	Sharma & Parida, 1987
51	<i>Neoscona</i> sp.	13	X	—	Sharma & Parida, 1987
52	<i>Neoscona</i> sp.	24	X1X2	—	Sharma & Parida, 1987
53	<i>N. umbratica</i> (Clerck, 1757)	24	X1X2	—	Mittal, 1960
54	<i>N. umbratica</i> (Clerck, 1757)	24	X1X2	22A+X1X2A	Mittal, 1966a
Clubionidae Wagner, 1887					
55	<i>Clubiona drassodes</i> O.P.-Cambridge, 1874	22	X1X2	—	Mittal, 1961
56	<i>C. drassodes</i> O.P.-Cambridge, 1874	22	X1X2	20A+X1X2A	Mittal, 1966b
57	<i>Clubiona ludhianaensis</i> Tikader, 1976	26	X1X2	—	Datta & Chatterjee, 1983
58	<i>Clubiona</i> sp	26	X1X2	Srivastava & Shukla, 1986
Corinnidae Karsch, 1880					
59	<i>Castianeira longipalpa</i> (Hentz, 1847)	26	X ₁ X ₂	—	Mittal, 1961
60	<i>C. longipalpa</i> (Hentz, 1847)	26	X ₁ X ₂	24A+X ₁ X ₂ A	Mittal, 1966b
61	<i>Castianeira zetes</i> Simon, 1897	26	X ₁ X ₂	24A+X ₁ X ₂ A	Bole-Gowda, 1958
Dipluridae Simon, 1889					
62	<i>Ischnothele indicola</i> Tikader, 1969	86	X ₁ X ₂	—	Srivastava & Shukla, 1986
Eresidae C.L. Koch, in Berendt 1845					
63	<i>Stegodyphus sarasinorum</i> Karsch, 1891	30	X ₁ X ₂	28A+X ₁ X ₂ A	Bole-Gowda, 1958

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
64	<i>S. sarasinorum</i> Karsch, 1891	24	X_1X_2	22A+ X_1X_2 A	Mittal, 1970a
65	<i>S. sarasinorum</i> Karsch, 1891	30	X_1X_2	—	Srivastava & Shukla, 1986
66	<i>S. sarasinorum</i> Karsch, 1891	30	X_1X_2	—	Parida & Sharma, 1987a
67	<i>S. sarasinorum</i> Karsch, 1891	30	X_1X_2	—	Sharma & Parida, 1987
Eutichuridae Lehtinen, 1967					
68	<i>Cheiracanthium himalayense</i> Gravely, 1931	26	X_1X_2	—	Datta & Chatterjee, 1983
69	<i>Cheiracanthium insigne</i> O.P.-Cambridge, 1874	26	X_1X_2	—	Datta & Chatterjee, 1983
70	<i>Cheiracanthium melanostomum</i> (Thorell, 1895)	43	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
71	<i>C. melanostomum</i> (Thorell, 1895)	26	X_1X_2	—	Parida & Sharma, 1987a
72	<i>C. melanostomum</i> (Thorell, 1895)	26	X_1X_2	—	Sharma & Parida, 1987
73	<i>Cheiracanthium murinum</i> (Thorell, 1895)	23	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
74	<i>Cheiracanthium saraswatii</i> Tikader, 1962	43	$X_1X_2X_3$	—	Srivastava & Shukla, 1986
75	<i>Cheiracanthium</i> sp.	26	X_1X_2	—	Srivastava & Shukla, 1986
76	<i>Strotarchus vittatus</i> Dyal, 1935	22	X_1X_2	—	Mittal, 1960
77	<i>S. vittatus</i> Dyal, 1935	22	X_1X_2	10M+10A+ X_1X_2 A	Mittal, 1966b
Gnaphosidae Pocock, 1898					
78	<i>Cesonia</i> sp.	22	X_1X_2	—	Srivastava & Shukla, 1986 <i>continued.....</i>

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
79	<i>Drassodes</i> sp.	21	X	—	Srivastava & Shukla, 1986
80	<i>Drassodes</i> sp.	21	X	—	Srivastava & Shukla, 1986
81	<i>Gnaphosa kailana</i> Tikader, 1966	22	X1X2	—	Mittal, 1961
82	<i>G. kailana</i> Tikader, 1966	22	X1X2	20A+X1X2A	Mittal, 1967
83	<i>Gnaphosa</i> sp.	22	X1X2	—	Datta & Chatterjee, 1983
84	<i>Gnaphosa</i> sp.	22	X1X2	—	Srivastava & Shukla, 1986
85	<i>Gnaphosa</i> sp.	22	X1X2	20T+X1X2T	Datta & Chatterjee, 1989
86	<i>Megamyrmaekion</i> sp.	22	X1X2	—	Srivastava & Shukla, 1986
87	<i>Phaeoceedus</i> sp.	22	X1X2	—	Mittal, 1961
88	<i>Phaeoceedus</i> sp.	22	X1X2	20A+X1X2A	Mittal, 1985
89	<i>Scopoides</i> sp.	22	X1X2	—	Sharma & Parida, 1987
90	<i>Scotophaeus blackwalli</i> (Thorell, 1871)	24	X1X2	—	Mittal, 1961
91	<i>S. blackwalli</i> (Thorell, 1871)	24	X1X2	22A+X1X2A	Mittal, 1967
92	<i>Scotophaeus domesticus</i> Tikader, 1962	30	X1X2	—	Srivastava & Shukla, 1986
93	<i>Urozelotes rusticus</i> (L. Koch, 1872)	21	X	—	Srivastava & Shukla, 1986
Hersiliidae Thorell, 1870					
94	<i>Hersilia savignyi</i> Lucas, 1836	30	X ₁ X ₂	28A+X ₁ X ₂ A	Bole-Gowda, 1958

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
95	<i>H. savignyi</i> Lucas, 1836	32	X_1X_2	—	Sharma et al., 1960
96	<i>H. savignyi</i> Lucas, 1836	30	X_1X_2	—	Srivastava & Shukla, 1986
97	<i>H. savignyi</i> Lucas, 1836	30	X_1X_2	—	Parida & Sharma, 1987a
98	<i>H. savignyi</i> Lucas, 1836	30	X_1X_2	—	Sharma & Parida, 1987
Linyphiidae Blackwall, 1859					
99	<i>Labulla nepula</i> Tikader, 1970	25	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
100	<i>Lepthyphantes bhudbari</i> Tikader, 1970	25	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
Liocranidae Simon, 1897					
101	<i>Oedignatha scrobiculata</i> Thorell, 1881	26	X_1X_2	$24A+X_1X_2A$	Bole-Gowda, 1958
Lycosidae Sundevall, 1833					
102	<i>Anomalomma harishi</i> Dyal, 1935	28	X_1X_2	—	Mittal, 1961
103	<i>A. harishi</i> Dyal, 1935	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1963
104	<i>Anomalomma</i> sp.	28	X_1X_2	$26A+X_1X_2A$	Sharma et al., 1958
105	<i>Arctosa mulani</i> (Dyal, 1935)	28	X_1X_2	$26A+X_1X_2A$	Sharma et al., 1958
106	<i>Arctosa</i> sp.	28	X_1X_2	—	Mittal, 1960
107	<i>Arctosa</i> sp.	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1963
108	<i>Crocodylosa leucostigma</i> (Simon, 1885)	28	X_1X_2	—	Srivastava & Shukla, 1986

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
109	<i>Draposa lyrivulva</i> (Bösenberg & Strand, 1906)	28	X_1X_2	$26A+X_1X_2A$	Bole-Gowda, 1958
110	<i>D. lyrivulva</i> (Bösenberg & Strand, 1906)	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1963
111	<i>D. lyrivulva</i> (Bösenberg & Strand, 1906)	24	X_1X_2	—	Srivastava & Shukla, 1986
112	<i>Draposa oakleyi</i> Gravely, 1924	28	X_1X_2	$26A+X_1X_2A$	Sharma et al., 1958
113	<i>D. oakleyi</i> Gravely, 1924	26	X_1X_2	—	Srivastava & Shukla, 1986
114	<i>Evippa praelongipes</i> (O.P.-Cambridge, 1870)	26	X_1X_2	$24A+X_1X_2A$	Sharma et al., 1958
115	<i>Hippasa agelenoides</i> (Simon, 1884)	28	X_1X_2	$26A+X_1X_2A$	Bole-Gowda, 1958
116	<i>H. agelenoides</i> (Simon, 1884)	24	X_1X_2	$22A+X_1X_2A$	Sharma et al., 1958
117	<i>Hippasa madhuae</i> Tikader & Malhotra, 1980	28	X_1X_2	$26A+X_1X_2A$	Parida et al., 1986
118	<i>Hippasa olivacea</i> (Thorell, 1887)	28	X_1X_2	$26A+X_1X_2A$	Parida & Sharma, 1987b
119	<i>H. olivacea</i> (Thorell, 1887)	28	X_1X_2	—	Parida & Sharma, 1987a
120	<i>H. olivacea</i> (Thorell, 1887)	28	X_1X_2	—	Sharma & Parida, 1987
121	<i>Hippasa pisaurina</i> Pocock, 1900	26	X_1X_2	—	Mittal, 1960
122	<i>H. pisaurina</i> Pocock, 1900	26	X_1X_2	$24A+X_1X_2A$	Mittal, 1963
123	<i>H. pisaurina</i> Pocock, 1900	28	X_1X_2	—	Srivastava & Shukla, 1986
124	<i>Hippasa</i> sp.	22	X_1X_2	—	Parida & Sharma, 1987a
125	<i>Hippasa</i> sp.	22	X_1X_2	—	Sharma & Parida, 1987

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
126	<i>Hogna himalayensis</i> (Gravely, 1924)	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
127	<i>Lycosa barnesi</i> Gravely, 1924	27	X	—	Srivastava & Shukla, 1986
128	<i>Lycosa bistriata</i> Gravely, 1924	28	X ₁ X ₂	26A+X ₁ X ₂ A	Bole-Gowda, 1958
129	<i>Lycosa carmichaeli</i> Gravely, 1924	28	X ₁ X ₂	—	Mittal, 1961
130	<i>L. carmichaeli</i> Gravely, 1924	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
131	<i>L. carmichaeli</i> Gravely, 1924	22	X ₁ X ₂	—	Srivastava & Shukla, 1986
132	<i>Lycosa chaperi</i> Simon, 1885	22	X ₁ X ₂	20A+X ₁ X ₂ A	Mittal, 1963
133	<i>Lycosa madani</i> Pocock, 1901	24	X ₁ X ₂	22A+X ₁ X ₂ A	Mittal, 1963
134	<i>Lycosa nigrotibialis</i> Simon, 1884	28	X ₁ X ₂	—	Mittal, 1961
135	<i>L. nigrotibialis</i> Simon, 1884	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
136	<i>L. nigrotibialis</i> Simon, 1884	24	X ₁ X ₂	—	Srivastava & Shukla, 1986
137	<i>Lycosa phipsoni</i> Pocock, 1899	—	X ₁ X ₂	—	Mittal, 1961
138	<i>Lycosa</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Bole-Gowda, 1958
139	<i>Lycosa</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Sharma et al., 1958
140	<i>Lycosa</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
141	<i>Lycosa</i> sp.	18	X ₁ X ₂	—	Srivastava & Shukla, 1986
142	<i>Lycosa</i> sp.	28	X ₁ X ₂	—	Srivastava & Shukla, 1986

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
143	<i>Lycosa</i> sp.	22	X ₁ X ₂	20A+X ₁ X ₂ A	Parida & Sharma, 1987b
144	<i>Lycosa</i> sp.	22	X ₁ X ₂	—	Parida & Sharma, 1987a
145	<i>Lycosa</i> sp.	28	X ₁ X ₂	—	Parida & Sharma, 1987a
146	<i>Lycosa</i> sp.	22	X ₁ X ₂	—	Sharma & Parida, 1987
147	<i>Lycosa</i> sp.	28	X ₁ X ₂	—	Sharma & Parida, 1987
148	<i>Lycosa</i> sp.	21	X ₁ X ₂ Y	16T+2St+X ₁ X ₂ M/Sm+YTNavia et al., 2006	
149	<i>Margonia himalayensis</i> (Gravely, 1924)	28	X ₁ X ₂	—	Mittal, 1961
150	<i>M. himalayensis</i> (Gravely, 1924)	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
151	<i>Ocyale kumari</i> Dyal, 1935	22	X ₁ X ₂	20A+X ₁ X ₂ A	Sharma et al., 1958
152	<i>Pardosa basiri</i> (Dyal, 1935)	22	X ₁ X ₂	—	Mittal, 1960
153	<i>P. basiri</i> (Dyal, 1935)	22	X ₁ X ₂	20A+X ₁ X ₂ A	Mittal, 1963
154	<i>Pardosa birmanica</i> Simon, 1884	28	X ₁ X ₂	26A+X ₁ X ₂ A	Bole-Gowda, 1958
155	<i>P. birmanica</i> Simon, 1884	28	X ₁ X ₂	—	Datta & Chatterjee, 1983
156	<i>P. birmanica</i> Simon, 1884	28	X ₁ X ₂	—	Srivastava & Shukla, 1986
157	<i>P. birmanica</i> Simon, 1884	28	X ₁ X ₂	26A+X ₁ X ₂ A	Parida & Sharma, 1987b
158	<i>P. birmanica</i> Simon, 1884	28	X ₁ X ₂	—	Parida & Sharma, 1987a
159	<i>P. birmanica</i> Simon, 1884	28	X ₁ X ₂	—	Sharma & Parida, 1987

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
160	<i>P. birmanica</i> Simon, 1884	28	X ₁ X ₂	26T+X ₁ X ₂ T	Datta & Chatterjee, 1989
161	<i>Pardosa fletcheri</i> (Gravely, 1924)	28	X ₁ X ₂	—	Srivastava & Shukla, 1986
162	<i>P. pseudoannulata</i> (Bösenberg & Strand, 1906)	28	X ₁ X ₂	26A+X ₁ X ₂ A	Bole-Gowda, 1958
163	<i>Pardosa sumatrana</i> (Thorell, 1890)	24	X ₁ X ₂	22A+X ₁ X ₂ A	Sharma, 1961
164	<i>P. sumatrana</i> (Thorell, 1890)	28	X ₁ X ₂	—	Srivastava & Shukla, 1986
165	<i>Pardosa</i> sp.	28	X ₁ X ₂	26T+X ₁ X ₂ T	Sharma & Gupta, 1956
166	<i>Pardosa</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Bole-Gowda, 1958
167	<i>Pardosa</i> sp.	28	X ₁ X ₂	—	Mittal, 1960
168	<i>Pardosa</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
169	<i>Piratula latitans</i> (Blackwall, 1841)	24	X ₁ X ₂	22A+X ₁ X ₂ A	Mittal, 1963
170	<i>Schizocosa</i> sp.	28	X ₁ X ₂	—	Mittal, 1960
171	<i>Schizocosa</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1963
172	<i>Trochosa punctipes</i> (Gravely, 1924)	28	X ₁ X ₂	26A+X ₁ X ₂ A	Sharma, 1961
173	<i>Venonia</i> sp.	26	X ₁ X ₂	—	Mittal, 1961
174	<i>Venonia</i> sp.	26	X ₁ X ₂	—	Mittal, 1961
175	<i>Venonia</i> sp.	26	X ₁ X ₂	24A+X ₁ X ₂ A	Mittal, 1963

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
176	<i>Wadicosia quadrifera</i> (Gravely, 1924)	27	X	—	Srivastava & Shukla, 1986
Nephilidae Simon, 1894					
177	<i>Nephila clavata</i> L. Koch, 1878	24	X ₁ X ₂	22T+X ₁ X ₂ T	Datta & Chatterjee, 1988
Oecobiidae Blackwall, 1862					
178	<i>Oecobius putus</i> O.P.-Cambridge, 1876	25	X ₁ X ₂ X ₃	22A+X ₁ X ₂ X ₃ A	Mittal, 1983
179	<i>O. putus</i> O.P.-Cambridge, 1876	25	X ₁ X ₂ X ₃	—	Srivastava & Shukla, 1986
Oxyopidae Thorell, 1870					
180	<i>Oxyopes hindostanicus</i> Pocock, 1901	21	X	20A+XA	Bole-Gowda, 1950
181	<i>O. hindostanicus</i> Pocock, 1901	21	X	—	Mittal, 1961
182	<i>O. hindostanicus</i> Pocock, 1901	21	X	20A+XA	Mittal, 1970b
183	<i>Oxyopes lepidus</i> (Blackwall, 1864)	21	X	20A+XA	Bole-Gowda, 1958
184	<i>Oxyopes pandae</i> Tikader, 1969	21	X	—	Srivastava & Shukla, 1986
185	<i>Oxyopes ratnae</i> Tikader, 1970	21	X	—	Datta & Chatterjee, 1983
186	<i>O. ratnae</i> Tikader, 1970	21	X	—	Parida & Sharma, 1987a
187	<i>O. ratnae</i> Tikader, 1970	21	X	—	Sharma & Parida, 1987
188	<i>O. ratnae</i> Tikader, 1970	21	X	20T+XT	Datta & Chatterjee, 1989
189	<i>Oxyopes rufisternis</i> Pocock, 1901	21	X	—	Mittal, 1961
continued.....					

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
190	<i>O. rufisternis</i> Pocock, 1901	21	X	20A+XA	Mittal, 1970b
191	<i>Oxyopes ryvesi</i> Pocock, 1901	21	X	—	Sharma <i>et al.</i> , 1960
192	<i>Oxyopes shweta</i> Tikader, 1970	21	X	—	Parida & Sharma, 1987a
193	<i>O. shweta</i> Tikader, 1970	21	X	—	Sharma & Parida, 1987
194	<i>Oxyopes sushilae</i> Tikader, 1965	21	X	—	Srivastava & Shukla, 1986
195	<i>Oxyopes</i> sp.	21	X	—	Sharma <i>et al.</i> , 1960
196	<i>Oxyopes</i> sp.	22	X ₁ X ₂	—	Mittal, 1961
197	<i>Oxyopes</i> sp.	22	X ₁ X ₂	20A+X ₁ X ₂ A	Mittal, 1970b
198	<i>Oxyopes</i> sp.	21	X	—	Srivastava & Shukla, 1986
199	<i>Oxyopes</i> sp.	21	X	—	Srivastava & Shukla, 1986
200	<i>Peucetia viridana</i> (Stoliczka, 1869)	28	X ₁ X ₂	26A+X ₁ X ₂ A	Bole-Gowda, 1950
201	<i>P. viridana</i> (Stoliczka, 1869)	28	X ₁ X ₂	—	Parida & Sharma, 1987a
202	<i>P. viridana</i> (Stoliczka, 1869)	28	X ₁ X ₂	—	Sharma & Parida, 1987
Philodromidae Thorell, 1870					
203	<i>Philodromus</i> sp.	25	X ₁ X ₂ X ₃	22A+X ₁ X ₂ X ₃ A	Mittal & Singh, 1984
Pholcidae C.L. Koch, 1850					
204	<i>Artema atlanta</i> Walckenaer, 1837	32	X ₁ X ₂	—	Parida & Sharma, 1987a <i>continued</i>

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
205	<i>A. atlanta</i> Walckenaer, 1837	32	X ₁ X ₂	—	Sharma & Parida, 1987
206	<i>Crossopriza lyoni</i> (Blackwall, 1867)	27	X	26M+XM	Bole-Gowda, 1958
207	<i>C. lyoni</i> (Blackwall, 1867)	25	X	—	Srivastava & Shukla, 1986
208	<i>C. lyoni</i> (Blackwall, 1867)	23	X	—	Parida & Sharma, 1987a
209	<i>C. lyoni</i> (Blackwall, 1867)	23	X	—	Sharma & Parida, 1987
210	<i>Pholcus</i> sp.	26	X ₁ X ₂	—	Sharma & Parida, 1987
Pisauridae Simon, 1890					
211	<i>Dolomedes</i> sp.	28	X ₁ X ₂	—	Mittal, 1961
212	<i>Dolomedes</i> sp.	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1982
213	<i>Nilus phipsoni</i> (F.O.P.-Cambridge, 1898)	24	X ₁ X ₂	22A+X ₁ X ₂ A	Mittal, 1963
214	<i>Pisaura</i> sp.	29	X ₁ X ₂ X ₃	—	Srivastava & Shukla, 1986
215	<i>Pisaura</i> sp.	28	X ₁ X ₂	—	Parida & Sharma, 1987a
216	<i>Pisaura</i> sp.	28	X ₁ X ₂	—	Sharma & Parida, 1987
Salticidae Blackwall, 1841					
217	<i>Ballus chalybeius</i> (Walckenaer, 1802)	28	X ₁ X ₂	—	Mittal, 1960
218	<i>B. chalybeius</i> (Walckenaer, 1802)	28	X ₁ X ₂	26A+X ₁ X ₂ A	Mittal, 1964
219	<i>Flacillula</i> sp.	28	X ₁ X ₂	—	Mittal, 1961
continued.....					

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
220	<i>Flacillula</i> sp.	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1964
221	<i>Habrocestum rubroclypeatum</i> Lessert, 1927	28	X_1X_2	—	Mittal, 1960
222	<i>H. rubroclypeatum</i> Lessert, 1927	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1964
223	<i>Habronattus coecatus</i> (Hentz, 1846)	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1964
224	<i>Holcolaetis vellerea</i> Simon, 1910	28	X_1X_2	—	Mittal, 1961
225	<i>H. vellerea</i> Simon, 1909	28	X_1X_2	$26A+X_1X_2A$	Mittal, 1964
226	<i>Hyllus semicupreus</i> (Simon, 1885)	29	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
227	<i>Marpissa tigrina</i> Tikader, 1965	28	X_1X_2	—	Srivastava & Shukla, 1986
228	<i>Marpissa</i> sp.	28	X_1X_2	—	Datta & Chatterjee, 1983
229	<i>Marpissa</i> sp.	26	X_1X_2	—	Datta & Chatterjee, 1983
230	<i>Marpissa</i> sp.	28	X_1X_2	—	Srivastava & Shukla, 1986
231	<i>Marpissa</i> sp.	21	X	—	Srivastava & Shukla, 1986
232	<i>Myrmarachne bengalensis</i> Tikader, 1973	25	X	—	Datta & Chatterjee, 1983
233	<i>Myrmarachne laeta</i> (Thorell, 1887)	23	X	$22A+XA$	Bole-Gowda, 1958
234	<i>Myrmarachne melanocephala</i> MacLeay, 1839	23	X	$22A+XA$	Bole-Gowda, 1958
235	<i>Myrmarachne ranunni</i> Narayan, 1915	23	X	$22A+XA$	Bole-Gowda, 1958
236	<i>Phidippus</i> sp.	26	X_1X_2	—	Datta & Chatterjee, 1983

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
237	<i>Phidippus</i> sp.	28	X_1X_2	—	Datta & Chatterjee, 1983
238	<i>Phidippus</i> sp.	28	X_1X_2	—	Parida & Sharma, 1987a
239	<i>Phidippus</i> sp.	28	X_1X_2	—	Sharma & Parida, 1987
240	<i>Phintella vittata</i> (C.L. Koch, 1846)	28	X_1X_2	—	Datta & Chatterjee, 1983
241	<i>P. vittata</i> (C.L. Koch, 1846)	28	X_1X_2	—	Srivastava & Shukla, 1986
242	<i>Plexippus paykulli</i> (Audouin, 1826)	—	X_1X_2	—	Sharma, 1950
243	<i>P. paykulli</i> (Audouin, 1826)	28	X_1X_2	$26A+X_1X_2A$	Bole-Gowda, 1958
244	<i>Rhene indica</i> Tikader, 1973	23	X	—	Datta & Chatterjee, 1983
245	<i>Salticus</i> sp.	28	X_1X_2	$26A+X_1X_2A$	Bole-Gowda, 1958
246	<i>Telamonia dimidiata</i> (Simon, 1899)	28	X_1X_2	—	Parida & Sharma, 1987a
247	<i>T. dimidiata</i> (Simon, 1899)	28	X_1X_2	—	Sharma & Parida, 1987
Selenopidae Simon, 1897					
248	<i>Makdiops montigenus</i> (Simon, 1889)	29	$X_1X_2X_3$	—	Mittal, 1961
249	<i>M. montigenus</i> (Simon, 1889)	29	$X_1X_2X_3$	$26A+X_1X_2X_3A$	Mittal, 1966d
250	<i>Selenops radiatus</i> Latreille, 1819	29	$X_1X_2X_3$	$26A+X_1X_2X_3A$	Sharma et al., 1959
251	<i>Selenops</i> sp.	29	$X_1X_2X_3$	—	Srivastava & Shukla, 1986
Sparassidae Bertkau, 1872					
252	<i>Heteropoda leprosa</i> Simon, 1884	41	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
253	<i>Heteropoda phasma</i> Simon, 1897	41	$X_1X_2X_3$	—	Srivastava & Shukla, 1986
254	<i>Heteropoda sexpunctata</i> Simon, 1885	21	X	$18M+2A+XM$	Bole-Gowda, 1952

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Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
255	<i>H. venatoria</i> (Linnaeus, 1767)	41	$X_1X_2X_3$	$38A+X_1X_2X_3A$	Bole-Gowda, 1952
256	<i>H. venatoria</i> (Linnaeus, 1767)	41	$X_1X_2X_3$	—	Srivastava & Shukla, 1986
257	<i>Micrommata</i> sp.	42	X_1X_2	—	Datta & Chatterjee, 1983
258	<i>Micrommata</i> sp.	44	$X_1X_2X_3X_4$	—	Datta & Chatterjee, 1983
259	<i>Micrommata</i> sp.	42	X_1X_2	—	Datta & Chatterjee, 1983
260	<i>Micrommata</i> sp.	41	$X_1X_2X_3$	$38A+X_1X_2X_3A$	Parida & Sharma, 1986
261	<i>Micrommata</i> sp.	44	X_1X_2	—	Parida & Sharma, 1987a
262	<i>Micrommata</i> sp.	42	X_1X_2	—	Parida & Sharma, 1987a
263	<i>Micrommata</i> sp.	41	$X_1X_2X_3$	—	Parida & Sharma, 1987a
264	<i>Micrommata</i> sp.	41	$X_1X_2X_3$	—	Parida & Sharma, 1987a
265	<i>Micrommata</i> sp.	22	X_1X_2	—	Parida & Sharma, 1987a
266	<i>Micrommata</i> sp.	44	X_1X_2	—	Sharma & Parida, 1987
267	<i>Micrommata</i> sp.	42	X_1X_2	—	Sharma & Parida, 1987
268	<i>Micrommata</i> sp.	41	$X_1X_2X_3$	—	Sharma & Parida, 1987
269	<i>Micrommata</i> sp.	41	$X_1X_2X_3$	—	Sharma & Parida, 1987
270	<i>Micrommata</i> sp.	22	X_1X_2	—	Sharma & Parida, 1987
271	<i>Olios lamarcki</i> (Latreille, 1806)	42	X_1X_2	$40A+X_1X_2A$	Bole-Gowda, 1952
272	<i>Parapalystes whiteae</i> (Pocock, 1902)	43	$X_1X_2X_3$	—	Mittal, 1961
273	<i>P. whiteae</i> (Pocock, 1902)	43	$X_1X_2X_3$	$40A+X_1X_2X_3A$	Mittal, 1966d

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Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
274	<i>Pseudopoda prompta</i> (O.P.-Cambridge, 1885)	41	$X_1X_2X_3$	—	Srivastava & Shukla, 1986
275	<i>Spariolenus tigris</i> Simon, 1880	41	$X_1X_2X_3$	$38A+X_1X_2X_3A$	Bole-Gowda, 1952
Tetragnathidae Menge, 1866					
276	<i>Leucauge. celebesiana</i> (Walckenaer, 1841)	25	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
277	<i>L. celebesiana</i> (Walckenaer, 1841)	25	$X_1X_2X_3$	$22T+X_1X_2X_3T$	Datta & Chatterjee, 1988
278	<i>Leucauge decorata</i> (Blackwall, 1864)	24	X_1X_2	$22A+X_1X_2A$	Bole-Gowda, 1958
279	<i>L. decorata</i> (Blackwall, 1864)	25	$X_1X_2X_3$	$22A+X_1X_2X_3A$	Sharma et al., 1959
280	<i>L. decorata</i> (Blackwall, 1864)	25	$X_1X_2X_3$	$22T+X_1X_2X_3T$	Datta & Chatterjee, 1988
281	<i>Leucauge tessellata</i> (Thorell, 1887)	25	$X_1X_2X_3$	—	Datta & Chatterjee, 1983
282	<i>L. tessellata</i> (Thorell, 1887)	25	$X_1X_2X_3$	$22T+X_1X_2X_3T$	Datta & Chatterjee, 1988
283	<i>M. segmentata</i> (Clerck, 1757)	24	$X_1X_2X_3X_4$	—	Datta & Chatterjee, 1983
284	<i>M. segmentata</i> (Clerck, 1757)	24	$X_1X_2X_3X_4$	$20T+X_1X_2X_3X_4T$	Datta & Chatterjee, 1988
285	<i>Tetragnatha andamanensis</i> Tikader, 1977	24	X_1X_2	—	Datta & Chatterjee, 1983
286	<i>T. andamanensis</i> Tikader, 1977	24	X_1X_2	—	Datta & Chatterjee, 1983
287	<i>T. andamanensis</i> Tikader, 1977	24	X_1X_2	$22T+X_1X_2T$	Sharma & Parida, 1987
288	<i>Tetragnatha boydi</i> O.P.-Cambridge, 1898	24	X_1X_2	$22T+X_1X_2T$	Datta et al., 1995
289	<i>Tetragnatha ceylonica</i> O.P.-Cambridge, 1869	24	X_1X_2	—	Datta & Chatterjee, 1983
290	<i>T. ceylonica</i> O.P.-Cambridge, 1869	24	X_1X_2	$22T+X_1X_2T$	Datta et al., 1995
291	<i>Tetragnatha mandibulata</i> Walckenaer, 1841	24	X_1X_2	$22A+X_1X_2A$	Mittal, 1966c
292	<i>Tetragnatha</i> sp.	24	X_1X_2	—	Sharma et al., 1960

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
293	<i>Tetragnatha</i> sp.	24	X_1X_2	$22A+X_1X_2A$	Mittal, 1966b
Theraphosidae Thorell, 1869					
294	<i>Poecilotheria formosa</i> Bcock, 1899	110	$X_1X_2X_3X_4$	$30M+18Sm+18St+$ $40A+X_1X_2X_3M+X_4Sm$	Král <i>et al.</i> , 2011
Theridiidae Sundevall, 1833					
295	<i>Achaearanea budana</i> Tikader, 1970	22	X_1X_2	—	Datta & Chatterjee, 1983
296	<i>Argyrodes cyrtophorae</i> Tikader, 1963	22	X_1X_2	—	Datta & Chatterjee, 1983
297	<i>Argyrodes gazedes</i> Tikader, 1970	22	X_1X_2	—	Datta & Chatterjee, 1983
298	<i>Argyrodes gazingensis</i> Tikader, 1970	24	X_1X_2	—	Datta & Chatterjee, 1983
299	<i>Argyrodes</i> sp.	22	X_1X_2	—	Datta & Chatterjee, 1983
300	<i>Argyrodes</i> sp.	22	X_1X_2	—	Datta & Chatterjee, 1983
301	<i>Theridion</i> sp.	22	X_1X_2	—	Datta & Chatterjee, 1983
Thomisidae Sundevall, 1833					
302	<i>I. minutus</i> Tikader, 1960	23	X	—	Srivastava & Shukla, 1986
303	<i>Massuria sreepanchamii</i> (Tikader, 1962)	23	X	—	Datta & Chatterjee, 1983
304	<i>Mastira menoka</i> (Tikader, 1963)	23	X	$22A+XA$	Mittal <i>et al.</i> , 1993
305	<i>Ozyptila maratha</i> Tikader, 1971	21	X	—	Srivastava & Shukla, 1986
306	<i>Tarrocaneus viridis</i> Dyal, 1935	27	$X_1X_2X_3$	—	Mittal, 1961

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Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
307	<i>T. viridis</i> Dyal, 1935	27	$X_1X_2X_3$	$24A+X_1X_2X_3A$	Mittal, 1966d
308	<i>Thomisus beautifularis</i> Basu, 1965	23	X	—	Datta & Chatterjee, 1983
309	<i>Thomisus</i> sp.	23	X	$22A+XA$	Bole-Gowda, 1958
310	<i>Xysticus croceus</i> Fox, 1937	23	X	—	Datta & Chatterjee, 1983
311	<i>Xysticus roonwali</i> Tikader, 1964	23	X	—	Srivastava & Shukla, 1986
312	<i>Xysticus</i> sp.	23	X	$22A+XA$	Gorlov et al., 1995
Trachelidae Simon, 1897					
313	<i>Trachelas</i> sp.	24	X_1X_2	—	Datta & Chatterjee, 1983
Trochanteriidae Karsch, 1879					
314	<i>Plator pandeae</i> Tikader, 1969	22	X_1X_2	—	Srivastava & Shukla, 1986
Uloboridae Thorell, 1869					
315	<i>Uloborus danolius</i> Tikader, 1969	17	X	—	Datta & Chatterjee, 1983
316	<i>U. danolius</i> Tikader, 1969	10	X_1X_2	—	Parida & Sharma, 1987a
317	<i>U. danolius</i> Tikader, 1969	10	X_1X_2	—	Sharma & Parida, 1987
318	<i>U. danolius</i> Tikader, 1969	17	X	$16T+XT$	Datta & Chatterjee, 1992a
319	<i>Uloborus khasiensis</i> Tikader, 1969	18	X_1X_2	—	Datta & Chatterjee, 1983
320	<i>U. khasiensis</i> Tikader, 1969	18	X_1X_2	$16T+X_1X_2T$	Datta & Chatterjee, 1992a
321	<i>Uloborus krishnae</i> Tikader, 1970	19	$X_1X_2X_3$	—	Datta & Chatterjee, 1983

continued.....

Sr.No.	Spider	2n	SCS	Chromosomal morphology	Reference
322	<i>U. krishnae</i> Tikader, 1970	19	$X_1X_2X_3$	$16T+X_1X_2X_3T$	Datta & Chatterjee, 1992a
323	<i>Uloborus plumipes</i> Lucas, 1846	18	X_1X_2	$16A+X_1X_2A$	Mittal, 1970a
Zodariidae Thorell, 1881					
324	<i>Storena indica</i> Tikader & Patel, 1975	22	X_1X_2	—	Datta & Chatterjee, 1983
325	<i>S. indica</i> Tikader & Patel, 1975	22	X_1X_2	$20T+X_1X_2T$	Datta & Chatterjee, 1989

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